

### **REMARKS/ARGUMENTS**

Applicant thanks Examiner for the detailed Office Action dated June 12, 2007. In response to the issues raised, the Applicant offers the following submissions and amendments.

#### **Amendments**

Independent claims 1, 17 and 33 have been amended to define that the actuation energy is an electrical pulse having a duration less than 2 microseconds. Dependent claims 5, 21 and 36 have been amended to further characterize the electrical pulse to have a duration less than 1 microseconds. The pulse duration times are discussed in detail at page 3, line 19 and page 9, line 17.

Accordingly, the amendments do not add new matter.

#### **35 U.S.C. §103 - Claims**

Claims 1 to 5, 17 to 21 and 34 to 36 stand rejected as obvious in light of US 6,019,457 to Silverbrook.

As discussed above, the independent claims have been amended to highlight that the drive pulse used in the present invention is far smaller than that of the '457 printhead. The cited printhead has an actuation energy of 200 nJ (see col. 19, line 8). As '457 explains, the actuation energy should be reduced if possible. If it were possible, or obvious to modify the '457 design to further reduce the actuation energy, the actuation energy have been lower. Furthermore, because the '457 heater is larger than the present invention and embedded rather than suspended, the bubble nucleation times are higher. Heating the larger element and losing heat to the solid layers of the printhead, delays the temperature rise to the super heated ranged. As described many times in the '457 specification, the pulse time is 6.25 microseconds (see for example col. 16, lines 15 and 16).

The present invention provides a printhead that eject with an actuation energy less than 180 nJ with a drive pulse duration less than 2 microseconds. The energy efficiency of the present invention allows self cooling operation, high nozzle densities, print speeds and image quality. This is not an obvious derivation from the disclosure of the '457 reference.

Accordingly, the cited reference does not teach fundamental elements of claims 1, 17 and 33. It therefore also fails to render claims 2 to 4, 18 to 21 and 34 to 36.

Claims 6, 9, 13, 14, 16, 22, 25, 29, 30, 32, 37, 40, 44, 45 and 47 stand rejected as obvious in light of '457 in view of US 5,706,041 to Kubby. As discussed above, '457 fails to teach all the elements of amended claims 1, 17 and 33. Kubby also fails to disclose a drive pulse of less than 180 nJ with a duration less than 2 microseconds. Accordingly, the cited references do not teach or suggest all claim elements and so fail to support a §103 rejection.

### **35USC§101 – Claims**

The claims stand rejected for statutory double patenting in view of the claims of US 6,692,108. Independent claims 1, 17 and 33 have been amended to define that the drive pulse has a duration less than 2 microseconds. This additional limitation ensures that all the present claims have respective scopes that are not co-extensive with any of the '108 claims.

### **Specification**

The Applicant has inserted a paragraph entitled "Cross-Reference to Related Applications" at Page 1 of the Specification. The Applicant submits that this amendment introduces no new matter.

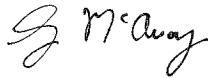
### **Information Disclosure Statement**

The Applicant encloses a copy of the Information Disclosure Statement filed May 13, 2005, as well as a copy of each cited foreign patent document and respectfully requests that this IDS now be considered.

It is respectfully submitted that the Examiner's rejections have been successfully traversed and the application is now in condition for allowance. Accordingly, favorable reconsideration is courteously solicited.

Very respectfully,

Applicants:



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